

Claims

1. A safety switching apparatus for safely disconnecting an electrical load from a power supply, the apparatus comprising:

at least one output switch serially arranged within a power supply path to the load, wherein the at least one output switch has at least two different switching positions,

a control unit adapted to control the switching positions,

an RF generator for generating an RF test signal, and

a coupling circuit adapted to lead the RF test signal across the at least one output switch,

wherein the control unit is adapted to monitor the switching positions by means of the RF test signal,

wherein the coupling circuit is a resonant circuit having a resonance frequency, and

wherein the output switch is embedded in the resonant circuit such that the resonance frequency is changed in response to the switching position.

2. The safety switching apparatus of Claim 1, wherein the coupling circuit has at least one isolating element providing DC isolation between the RF generator and the at least one output switch.
3. The safety switching apparatus of Claim 1, wherein the coupling circuit has at least one coupling capacitor.
4. The safety switching apparatus of Claim 3, wherein the coupling capacitor is implemented as a printed circuit board capacitance.
5. The safety switching apparatus of Claim 4, wherein the printed circuit board capacitance comprises conductor surfaces which are arranged on different layers of a multi-layer printed circuit board.
6. The safety switching apparatus of Claim 3, wherein the coupling circuit has at least two coupling capacitors.
7. The safety switching apparatus of Claim 1, further comprising a resistor arranged in series with the RF generator, wherein the resonant circuit interacts with the resistor such that a voltage drop across the resistor is a measure of the actual switching position of the output switch.
8. The safety switching apparatus of Claim 1, further comprising a housing accommodating the output switch, said housing having at least one connection terminal, and com-

prising an RF filter being arranged between the output switch and the connection terminal.

9. A safety switching apparatus for safely disconnecting an electrical load from a power supply, the apparatus comprising:

at least one output switch serially arranged within a power supply path to the load, wherein the at least one output switch has at least two different switching positions,

a control unit adapted to control the switching positions,

an RF generator for generating an RF test signal, and

a coupling circuit adapted to transmit the RF test signal to the at least one output switch for monitoring the switching position,

wherein the coupling circuit has at least one isolating element providing DC isolation between the RF generator and the at least one output switch.

10. The safety switching apparatus of Claim 9, wherein the coupling capacitor is implemented as a printed circuit board capacitance comprising conductor surfaces which are arranged on different layers of a multi-layer printed circuit board.

11. A safety switching apparatus for safely disconnecting an electrical load, comprising at least one output switch for interrupting a power supply path to the load, the output switch having at least two switching positions, comprising a control unit for controlling the switching position of the output switch, and further comprising an arrangement for monitoring the switching position of the output switch, wherein the arrangement comprises an RF generator for generating an RF test signal, and a coupling circuit adapted to transmit the test signal to the output switch.
12. The safety switching apparatus of Claim 11, wherein the coupling circuit has at least one isolating element which provides DC isolation between the RF generator and the at least one output switch.
13. The safety switching apparatus of Claim 11, wherein the coupling circuit has at least one coupling capacitor.
14. The safety switching apparatus of Claim 13, wherein the coupling capacitor has a printed circuit board capacitance.
15. The safety switching apparatus of Claim 14, wherein the printed circuit board capacitance has conductor surfaces which are arranged on different layers of an at least two-layer printed circuit board.
16. The safety switching apparatus of Claim 13, wherein the coupling circuit has at least two coupling capacitors.

17. The safety switching apparatus of Claim 11, wherein the coupling circuit comprises an electrical resonant circuit.
18. The safety switching apparatus of Claim 17, wherein the output switch is part of the resonant circuit.
19. The safety switching apparatus of Claim 17, further comprising a resistor arranged in series with the RF generator, wherein the resonant circuit interacts with the resistor such that a voltage drop across the resistor is a measure of the actual switching position of the output switch.
20. The safety switching apparatus of Claim 11, further comprising a housing accommodating the output switch, said housing having at least one connection terminal, and comprising an RF filter being arranged between the output switch and the connection terminal.